

REMARKS

The Office Action dated May 14, 2009 has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

Claims 1 and 4-5 have been amended to more particularly point out and distinctly claim the subject matter of the invention. Support for the amendment to claim 1 may be found in the specification, for example, at page 9, line 23 – page 10, line 17. Claim 15 has been added. Support for claim 15 may be found in the specification, for example, at Figures 2, 4, and 5. No new matter has been added. Therefore, claims 1-15 are currently pending in the application and are respectfully submitted for consideration.

Objection to Claims

The Office Action objected to claims 4 and 5 under 37 C.F.R. 1.75(a) for allegedly lacking antecedent basis. Specifically, the Office Action alleged that “the curved portion” of claim 4, and “the reduced diameter portion” of claim 5 lacks antecedent basis. Applicants respectfully submit that claim 4 has been amended to replace “the curved portion” with “a curved portion,” and claim 5 has been amended to replace “the reduced diameter portion” with “a reduced diameter portion.” Applicants submit that the amendments to claims 4 and 5 effectively moot the objection. Accordingly, Applicants respectfully request that the objection be withdrawn.

Claim Rejections Under 35 U.S.C. § 112

The Office Action rejected claims 1-14 under 35 U.S.C. §112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Specifically, the Office Action alleged that the following claim language is inaccurate and indefinite since it conflicts with the disclosed embodiment of the invention:

- “a first compressor provided in a downstream end of the intake passage,” (claim 1, line 9);
- “a turbine provided adjacent to an outlet end of the combustor,” (claim 1, line 11);
- “a rotary shaft rotatably received in the inner liner and having a front fan,” (claim 1, line 12); and
- “the rotary shaft further carrying an impeller wheel of the first compressor and a turbine wheel of the turbine” (claim 1, lines 14-15).

With respect to these limitations, the Office Action further alleged that contrary to what the claims state, the compressor and turbine wheels, as showed in Figure 1 of the specification, are not on the shaft with the fan, inner shaft 8, but rather on outer shaft 7. (See Office Action at pages 2-3).

The Office Action further alleged that the language “foreign matter introduction openings formed in the inner casing” (claim 1, line 18) is inaccurate and indefinite, alleging that Figures 2 and 5 of the specification show that the foreign matter introduction openings 33 are formed in outer liner 20, rather than inner casing 4. (See Office Action at page 3).

With respect to “a first compressor provided in a downstream end of the intake passage,” “a turbine provided adjacent to an outlet end of the combustor,” “a rotary shaft rotatably received in the inner liner and having a front fan,” and “the rotary shaft further carrying an impeller wheel of the first compressor and a turbine wheel of the turbine,” Applicants respectfully traverse the rejection for the following reasons.

Applicants respectfully submit that the Office Action’s position is incorrect regarding independent claim 1 requiring the impeller wheel of the first compressor, and the turbine wheel of the turbine, to reside on the same shaft as the front fan. Instead, the claim merely requires that the front fan, the impeller wheel of the first compressor, and the turbine wheel of the turbine reside on the rotary shaft. It appears that the confusion stems from the term “rotary shaft.” The specification defines a rotary shaft as including an outer shaft 7 and an inner shaft 8. (See Specification at page 7, lines 3-10). This means that a structure on the outer shaft 7, and a structure on the inner shaft 8, are both on the rotary shaft. Thus, claim 1, when properly read in light of the specification, does read on the disclosed embodiment as illustrated on Figure 1, because the front fan 12, the

impeller wheel 9, and the turbine wheel 11 all reside on the rotary shaft, even though the front fan 12 resides on the inner shaft 8, and the impeller wheel 9 and the turbine wheel 11 each reside on the outer shaft 7. Therefore, Applicants respectfully submit that the limitations “a first compressor provided in a downstream end of the intake passage,” “a turbine provided adjacent to an outlet end of the combustor,” “a rotary shaft rotatably received in the inner liner and having a front fan,” and “the rotary shaft further carrying an impeller wheel of the first compressor and a turbine wheel of the turbine,” are accurate, and thus, the aforementioned limitations are not indefinite.

With respect to “foreign matter introduction openings formed in the inner casing,” Applicants respectfully submit that claim 1 has been amended to replace to replace “a plurality of foreign matter introduction openings formed in the inner casing … a plurality of foreign matter ejection openings formed in the outer liner,” with “a plurality of foreign matter introduction openings formed in the outer liner … a plurality of foreign matter ejection openings formed in the inner casing.” Applicants further submit that the amendment to claim 1 effectively moots the Office Action’s rejection, with respect to the aforementioned limitation.

Finally, claims 2-14 depend upon independent claim 1, and thus, the rejections of those claims should be withdrawn as well, for at least the reasons discussed above. Accordingly, Applicants respectfully request that the rejection of claims 1-14, under 35 U.S.C. § 112, second paragraph, be withdrawn.

Claim Rejections Under 35 U.S.C. § 102

The Office Action rejected claims 1, 3-5, 8, 9, 11 and 14 under 35 U.S.C. §102(b) as allegedly being anticipated by Liu et al. (U.S. Patent No. 5,279,109) (“Liu”). The rejection is respectfully traversed for at least the following reasons.

Claim 1, upon which claims 2-15 are dependent, recites a gas turbine engine, which includes an outer casing, and an inner casing received in the outer casing so as to define a bypass duct having an annular cross section in cooperation with the outer casing. The gas turbine engine further includes an outer liner received in the inner casing, and an inner liner received in the outer liner so as to define an intake passage in cooperation with the outer liner. The gas turbine engine further includes a first compressor provided in a downstream end of the intake passage, and a combustor connected to an outlet end of the first compressor. The gas turbine engine further includes a turbine provided adjacent to an outlet end of the combustor, and a rotary shaft rotatably received in the inner liner and having a front fan attached to a front end thereof adjacent to both an inlet end of the bypass duct and an inlet portion of the intake passage, the rotary shaft further carrying a impeller wheel of the first compressor and a turbine wheel of the turbine at appropriate parts thereof. The gas turbine engine further includes a foreign matter removal passage communicating with the intake passage via a plurality of foreign matter introduction

openings formed in the outer liner and with the bypass duct via a plurality of foreign matter ejection openings formed in the inner casing.

As will be discussed below, Liu fails to disclose or suggest all of the elements of the claims, and therefore fails to provide the features discussed above.

Liu describes a gas turbine engine with a circumferentially disposed plurality of pivotal flow splitters between compressor sections to bleed off flow and remove particles by pivoting the leading edge of the splitter into the compressor flow. More specifically, Liu describes a gas turbine engine having a fan 8 that pressurizes and feeds air to a fan bleed duct 10 disposed between an inner fan case 11 and an outer fan case 12, and to an engine core flowpath 13. A booster 20 located at a forward position of engine core flowpath 13 rotates together with fan 8 on a low pressure rotor 22 driven by a conventional low pressure turbine and compresses air which is ducted to a conventional engine core compressor (See Liu at col. 5, lines 6-16).

Applicants respectfully submit that Liu fails to disclose, teach, or suggest, all of the elements of the present claims. For example, Liu fails to disclose, teach, or suggest, at least, “a rotary shaft rotatably received in the inner liner and having a front fan attached to a front end thereof adjacent to both an inlet end of the bypass duct and an inlet portion of the intake passage, the rotary shaft further carrying a impeller wheel of the first compressor and a turbine wheel of the turbine at appropriate parts thereof,” and “a foreign matter removal passage communicating with the intake passage via a plurality of

foreign matter introduction openings formed in the outer liner and with the bypass duct via a plurality of foreign matter ejection openings formed in the inner casing,” as recited in independent claim 1.

With respect to “a rotary shaft rotatably received in the inner liner and having a front fan attached to a front end thereof adjacent to both an inlet end of the bypass duct and an inlet portion of the intake passage, the rotary shaft further carrying a impeller wheel of the first compressor and a turbine wheel of the turbine at appropriate parts thereof,” Applicants respectfully submit that Liu fails to disclose or suggest a rotary shaft rotatably received in the inner liner and having a front fan attached to a front end. Specifically, Liu merely describes that the gas turbine engine has a fan 8 and a booster 20, and that the booster 20 rotates together with fan 8 on a low pressure rotor 22 driven by a low pressure turbine. (See Liu at col. 5, lines 8-14; Figure 1). There is no discussion of a rotary shaft in Liu, and no structure in Figure 1 of Liu is identified as a rotary shaft. Furthermore, Applicants respectfully submit that Liu fails to disclose or suggest a rotary shaft carrying a impeller wheel of a compressor and a turbine wheel of a turbine. While Liu describes a low-pressure turbine and an engine core compressor 24, there is no discussion, or suggestion, in Liu that either structure resides on a rotary shaft. Thus, Liu fails to disclose or suggest the aforementioned limitation of claim 1.

Furthermore, with respect to “a foreign matter removal passage communicating with the intake passage via a plurality of foreign matter introduction openings formed in

the outer liner and with the bypass duct via a plurality of foreign matter ejection openings formed in the inner casing,” Applicants respectfully submit that Liu fails to disclose, or suggest a plurality of foreign matter introduction openings. Specifically, Liu describes that the gas turbine engine includes a VBV door 30 and leading edge 31 arranged to pivot into the flowpath 13 between booster 20 and engine core compressor 24 to split off and bypass a portion of the flow in transition duct 27 and remove the particles entrained in that flow portion. Furthermore, a booster bleed inlet 26 is disposed in the wall of a transition duct 27 between booster 20 and engine core compressor 24, and is controlled by the engine’s VBV system. (See Liu at col. 5, lines 22 – 40). Thus, Liu merely discloses a single opening (i.e. booster bleed inlet 26), and fails to disclose a plurality of foreign matter introduction openings.

In an attempt to correct this deficiency, the Office Action alleged that that scoop inlet 34 of the VBD door 30 of Liu is a second foreign matter introduction opening (See Office Action at page 4, “foreign matter introduction openings 26/34”). However, independent claim 1 clearly recites that the foreign matter introduction openings are formed in the outer liner. The Office Action alleged that the “outer liner” of claim 1 is the upper wall of flow path 13 (See Office Action at page 3, “the outer and inner liners (unnumbered) defined by the walls of flow path 13”). It is clear that the scoop inlet 34, illustrated in Figure 1 of Liu, is not formed in the upper wall of flow path 13. In fact, the scoop inlet 34 is not formed in any wall (See Liu at Figure 1). Thus, the scoop inlet 34 of

Liu cannot be considered to be comparable to, a foreign matter introduction opening formed in the outer liner, because the scoop inlet 34 is not formed in any liner. For these reasons, Liu fails to disclose, or suggest, the aforementioned limitation of claim 1.

Therefore, for at least the reasons discussed above, Liu fails to disclose, teach, or suggest, all of the elements of independent claim 1. For the reasons stated above, Applicants respectfully request that this rejection be withdrawn.

Claims 3-5, 8, 9, 11 and 14 depend upon independent claim 1. Thus, Applicants respectfully submit that claims 3-5, 8, 9, 11 and 14 should be allowed for at least their dependence upon independent claim 1, and for the specific elements recited therein.

Regarding claims 2, 6-7, 10, and 12-13 it appears that the claims are not subject to a prior art rejection. A call to the Examiner was placed on May 19, 2009, and the Examiner confirmed that confirmed that the claims were subject to a rejection under 35 U.S.C. § 112, second paragraph, but not subject to a prior-art rejection. Applicants respectfully thank the Examiner for confirming the status of claims 2, 6-7, 10, and 12-13.

Claim 15 is dependent upon independent claim 1, and thus, should be allowed for at its dependence upon independent claim 1, and for the specific elements recited therein. Furthermore, claim 15 recites “wherein the foreign matter removal passage comprises an annular space surrounding the rotary shaft,” which is not disclosed or suggested by the cited prior art.

For at least the reasons discussed above, Applicants respectfully submit that the cited prior art references fail to disclose or suggest all of the elements of the claimed invention. These distinctions are more than sufficient to render the claimed invention unanticipated and unobvious. It is therefore respectfully requested that all of claims 1-15 be allowed, and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants' undersigned representative at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,


Keith M. Mullervy
Keith M. Mullervy
Registration No. 62,382

Customer No. 32294
SQUIRE, SANDERS & DEMPSEY LLP
14TH Floor
8000 Towers Crescent Drive
Vienna, Virginia 22182-6212
Telephone: 703-720-7800
Fax: 703-720-7802

KMM:sew